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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/807,015	11/06/2001	Torsten Prange	10191/1892	8352
26646	7590	08/10/2005	EXAMINER	
KENYON & KENYON ONE BROADWAY NEW YORK, NY 10004			OPSASNICK, MICHAEL N	
			ART UNIT	PAPER NUMBER
			2655	

DATE MAILED: 08/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/807,015

**Applicant(s)**

PRANGE ET AL.

**Examiner**

Michael N. Opsasnick

**Art Unit**

2655

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06 April 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 11-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

1. The substitute specification filed 11/6/2001 has been entered because it does conform to 37 CFR 1.125(b) and (c).

### ***Specification***

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "Quantizing Speech Signal Codewords To Reduce Memory Requirements".

### ***Drawings***

3. The drawings are objected to because Fig. 1 contains handwritten labels. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as

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“amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the claimed features pertaining to the scaling of codebook values by finding maximum positive and negative values, multiplication of said values, and updating the codebook values must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the

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drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 11-19,22-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Fette et al (5797121).

As per claim 11, Fette et al (5797121), teaches a method for one of coding and decoding speech sample values (as a vocoder – abstract; the encoder section – fig 4, and the decoder section – fig. 7) comprising the steps of:

“quantizing values previously obtained by an analysis from the speech signal samples values and used for a generation of speech signal parameters before being stored

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in codebooks/code tables, the quantizing occurring to a word length that result in no noticeable losses in speech quality” as scalar quantizing (col. 3 lines 38-50) the already derived speech parameters based upon the input speech (col. 3 lines 24-36 -- speech parameters such as ten linear predictive speech coefficients characterized as lsf's, reflection coefficients, etc., and represented as 24 or 48 bit floating point integers), wherein the scalar quantizing transforms this 24/48 bit representation into a fixed N bit number (col. 3 lines 42-47; col. 4 lines 40-43); wherein the bit representation is chosen at the point wherein one less bit representation would degrade the quality of the representation (col. 4 lines 1-7);

“storing in the codebooks/code tables the values previously obtained by the analysis from the speech signal sample values and used for the generation of speech signal parameters” as accessing the already stored high precision speech parameters (col. 3 lines --53, referring to the database/codebook of speech parameters in col. 3 lines 24-27; Fette et al (5797121) also teaches storing the scalar quantized codebook as well -- col. 4 lines 46-49);

“scaling the values of each codebook/code table such that an available range of values is exploited as completely as possible, the step of scaling including the steps of determining a maximum of a positive value and a minimum of a negative value of each codebook/code table” as scaling according to the maximum and minimum of the speech parameters (Col. 3 lines 40-47; examiner notes that the initial speech parameter representation is in 32 bit floating point format, and that the maximum/minimum range is not limited to positive numbers only)

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“ if the available range of values is exceeded, performing a multiplication of the values of each codebook/code table by a first factor smaller than one, and repeating the multiplication until all elements are located in the available range of values; and causing a number of repeated multiplications to be used as a scaling factor for all codebook/code table entries” as generating a range that represents all of the high precision speech parameters (Fig. 2, subblocks 40-44) and dividing the range into  $2^N$  intervals (Fig. 2, subblock 46) and after testing the initial quantization of the high precision parameters into an N bit representation, reducing the number of bits N to a number N-1 bits (Fig. 2, subblocks 48,50,52,54, back to subblock 48); until the minimum representation is achieved before sound quality degradation (col. 3 line 61 – col. 4 line 7). This reduction of 1 (one) bit representation is reducing the representation by a factor of 2, or 0.5. (for example, if the initial codelength is 32 bits, the number of representations for the range is  $2^{32}$ , or 4,294,967,296 representations; and after reducing the number of bits to 31, the number of representations for the range is now  $2^{31}$ , or 2,147,483,648, or half of the number of representations of  $2^{32}$ ).

As per claim 12, Fette et al (5797121) teaches the method according to claim 11 wherein the method is performed in accordance with a method of analysis through synthesis (examiner also notes that the speech parameters generated are through well know analysis by synthesis techniques – col. 3, lines 25-35 -- the linear prediction coefficients using codebooks, a type of analysis-by-synthesis coder; and col. 8 lines 13-18).

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As per claim 13, Fette et al (5797121) teaches the method according to claim 11 wherein the speech quality loss/evaluation is conducted thru hearing tests (col. 3 lines 57-60).

As per claim 14, Fette et al (5797121) teaches the method according to claim 11 wherein the first factor being .5 (the reduction of 1 (one) bit representation (Fig. 2, subblock 54 feedback into subblock 48) is reducing the representation by a factor of 2, or .5; for example, if the initial codelength is 32 bits, the number of representations for the range is  $2^{32}$ , or 4,294,967,296 representations; and after reducing the number of bits to 31, the number of representations for the range is now  $2^{31}$ , or 2,147,483,648, or half of the number of representations of  $2^{32}$ ).

As per claim 15, Fette et al (5797121) teaches the method according to claim 11 wherein the determining word lengths of the values stored in the codebooks/code table through hearing tests (col. 3 line 55 – col. 4 line 7).

As per claim 16, Fette et al (5797121) teaches the method according to claim 11, further comprising the step of scaling the codebook/ code table entries to but of a required value range (as scaling down the range down to  $2^N$  representation – col. 3 lines 39-45).

As per claim 17, Fette et al (5797121) teaches the method according to claim 16, further comprising the step of rounding and truncation of decimal places (as completing the scale-down of the parameters into fixed bits – col. 4 lines 40–46; examiner notes that the final storing of bit representation involves the calculation of dividing the established range for the high precision



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speech parameters in col. 3 lines 40-44, dividing that range into  $2^N$  intervals wherein N is the final determined bit representation, and converting the high precision 32 bit floating point representations into an N bit representation in col. 4 lines 44-45 (ranging from 2 bit to 5 bit representation), inherently involves rounding and truncation).

As per claim 18, Fette et al (5797121) teaches the use of a 32 bit word length (col. 4 lines 40-44; an artisan skilled in the art would readily recognize that using a 16 bit word length would only require different parameter organization while achieving equivalent results – col. 8 lines 10-12; especially since the largest quantized codevector needs 5 bits representation (fig. 3, LSF2); and that a 16 bit representation of the LSF's would only require a re-organization of the nomenclature unto itself).

As per claim 19, Fette et al (5797121) teaches the method according to claim 11 further comprising causing a processing of the codebook/code table entries to occur in accordance with a digital signal processing in a whole-number format (as the codebook entries represented initially in 32 bit floating point number representation – col. 4 lines 38-41).

As per claim 22, Fette et al (5797121) teaches an apparatus corresponding to one of a coder and a decoder for processing speech signal sample values in accordance with a method of analysis through synthesis (as a vocoder – abstract; the encoder section – fig 4, and the decoder section – fig. 7; examiner also notes that the speech parameters generated are through well know

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analysis by synthesis techniques – col. 3, lines 25-35 -- the linear prediction coefficients using codebooks, a type of analysis-by-synthesis coder; col. 8 lines 13-18) comprising:

“an arrangement for storing in quantized form values contained in codebooks/code tables for a generation of speech signal parameters; an arrangement for selecting a word length such that no noticeable losses in speech quality occur; an arrangement for quantizing the values contained in the codebooks/code tables to the word length that results in no noticeable losses in speech quality” as scalar quantizing (col. 3 lines 38-50) the already derived speech parameters based upon the input speech (col. 3 lines 24-36 -- speech parameters such as ten linear predictive speech coefficients characterized as  $l_{sf}$ 's, reflection coefficients, etc., and represented as 24 or 48 bit floating point integers), wherein the scalar quantizing transforms this 24/48 bit representation into a fixed N bit number (col. 3 lines 42-47; col. 4 lines 40-43); wherein the bit representation is chosen at the point wherein one less bit representation would degrade the quality of the representation (col. 4 lines 1-7);

“an arrangement for scaling the values of each codebook/code table such that an available range of values can be exploited as completely as possible; an arrangement for determining a maximum of positive values and negative values of each codebook/code table” as scaling according to the maximum and minimum of the speech parameters (Col. 3 lines 40-47; examiner notes that the initial speech parameter representation is in 32 bit floating point format, and that the maximum/minimum range is not limited to positive numbers only)

“and for multiplying the values of each codebook/code table by a first factor less than one if the if the available range of values is exceeded; and an arrangement for, if a multiplication of the values of the codebooks/code tables lies outside the available range of values, performing

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repeated multiplication until all elements are located in the available range of values, and for providing a number of repeated multiplication as a scaling factor” as generating a range that represents all of the high precision speech parameters (Fig. 2, subblocks 40-44) and dividing the range into  $2^N$  intervals (Fig. 2, subblock 46) and after testing the initial quantization of the high precision parameters into an N bit representation, reducing the number of bits N to a number N-1 bits (Fig. 2, subblocks 48,50,52,54, back to subblock 48); until the minimum representation is achieved before sound quality degradation (col. 3 line 61 – col. 4 line 7). This reduction of 1 (one) bit representation is reducing the representation by a factor of 2, or .5. (for example, if the initial codelength is 32 bits, the number of representations for the range is  $2^{32}$ , or 4,294,967,296 representations; and after reducing the number of bits to 31, the number of representations for the range is now  $2^{31}$ , or 2,147,483,648, or half of the number of representations of  $2^{32}$ ).

As per claim 23, Fette et al (5797121) teaches the apparatus according to claim 22, wherein the noticeable losses in speech quality are determined through a hearing test (col. 3 lines 56-60).

As per claim 24, Fette et al (5797121) teaches the apparatus according to claim 22 wherein the first factor is 0.5 ((the reduction of 1 (one) bit representation (Fig. 2, subblock 54 feedback into subblock 48) is reducing the representation by a factor of 2, or .5; for example, if the initial codelength is 32 bits, the number of representations for the range is  $2^{32}$ , or 4,294,967,296 representations; and after reducing the number of bits to 31, the number of

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representations for the range is now  $2^{31}$ , or 2,147,483,648, or half of the number of representations of  $2^{32}$ ).

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fette et al (5797121) in further view of Gersho et al (6233550).

As per claim 20, Fette et al (5797121) teaches the method according to claim 11, as shown above. Fette et al (5797121) discusses the use of his scalar design to be applied to vector codebooks (col. 4, lines 15-25 containing speech parameters including lines spectral frequencies, cepstral coefficients (both in col. 3 lines 25-32), along with other well-known speech coders (col. 8 lines 13-16). Fette et al (5797121) does not explicitly teach the claimed harmonic vector coding with spectral envelopes and LPCs; however, Gersho et al (6233550) teach a Harmonic coder (Fig. 4a) wherein in LP residuals, and spectral magnitudes are quantized (Fig. 4b, Fig. 4c; fig. 11). Therefore, it would have been obvious to one of ordinary skill in the art of speech coders/decoders at the time the invention was made to use the quantization procedure of Fette et al (5797121) into the different vector quantized parameters in Gersho et al

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(6233550) because it would introduce the saving of bits (i.e., using less bits giving the same representation of speech, as discussed above in Fette et al (5797121)), wherein such an efficiency being useful in harmonic coders (Gersho et al (6233550), col. 4 lines 58-65).

9. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fette et al (5797121) in further view of Tzeng (5307441).

As per claim 21, Fette et al (5797121) teaches the method according to claim 11, as shown above. Fette et al (5797121) discusses the use of his scalar design to be applied to vector codebooks (col. 4, lines 15-25 containing speech parameters including lines spectral frequencies, cepstral coefficients (both in col. 3 lines 25-32), along with other well-know speech coders (col. 8 lines 13-16). Fette et al (5797121) does not explicitly teaches the claimed CELP, values for LSP, VQ vector quantization, as well as gain VQ's; however, Tzeng teaches the use of quantization in an analysis by synthesis type coder (Fig 1; col. 2 lines 63-67) wherein the LSP, VQ's and gain VQ's are quantized (Tzeng (5307441), col. 12, lines 58-65; col. 7 lines 40-53). Therefore, it would have been obvious to one of ordinary skill in the art of speech coders/decoders at the time the invention was made to use the quantization procedure of Fette et al (5797121) into the different vector quantized parameters in Tzeng (5307441) because it would advantageously reduce memory requirements (Tzeng (5307441), col. 2 lines 65-68) as well as improving performance without memory overload, as well as saving data bits (col. 3, lines 1-15).

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***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Wong et al (5983174) teaches bit ordering for a speech coder.

Shoham (5719992) teaches constrained stochastic excitation codebooks.

Abe et al (5581652) teaches quantization of the codebook.

Swaminathan et al (5734789) teaches a variable bit vocoder.

Ketchum (5313554) teaches fixed point/floating point interoperability in a speech coder/decoder.

Lin (5570454) teaches manipulation of the mantissa into different frames.

Ganesan (5666370) teaches bit reordering in a speech coder.

Gersho et al (5889891) teaches constrained codebook storage.

Naylor et al (5806034) teaches bit conversion.

Walsh (5646618) teaches quantization of speech wavelets.

11. **Any response to this action should be mailed to:**

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**or faxed to:**

(703) 872 9314,

(for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal

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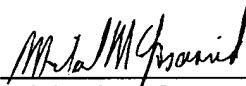
12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Opsasnick, telephone number (571)272-7623, who is available Tuesday-Thursday, 9am-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Wayne Young, can be reached at (571)272-7582. The facsimile phone number for this group is (571)272-7629.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group 2600 receptionist whose telephone number is (571) 272-2600, the 2600 Customer Service telephone number is (571)272-2600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

mno  
8/6/05

  
Michael N. Opsasnick  
Examiner  
Art Unit 2655